Registration of 'Vavilov' Siberian Crested Wheatgrass

'Vavilov' Siberian crested wheatgrass [Agropyron fragile (Roth) Candargy] (Reg. no. CV-23, PI 583980) was developed by the USDA-ARS Forage and Range Research Lab. at Utah State Univ. and released in cooperation with the Utah Agric. Exp. Stn. and the USDA-NRCS on 1 July 1994. The cultivar was named to recognize the contribution of the N.I. Vavilov Research Institute of Plant Industry, St. Petersburg, Russia (VIR), to the germplasm resources of the USDA-ARS range grass breeding program.

The parental germplasm for Vavilov was derived from accesses originally received from VIR, Stavropol Botanical Garden (Stavropol, Russia), and Eskişehir Plant Breeding Station (Eskişehir, Turkey) and from selections from the cultivar P-27. The C0 breeding population for Vavilov consisted of 10 plants selected from a genetically broad-based population on the basis of green-color retention and vegetative vigor during the late summer under extreme drought conditions on a range site in Box Elder County, Utah. This population was subjected to three cycles of selection for vegetative vigor, response to drought, resistance to diseases and insects, seedling vigor (emergence from deep seeding), seed yield, and plant type. Open-pollinated progenies from 14 selected clonal lines in the third breeding cycle were bulked to form breeder seed.

Seedling vigor of Vavilov, as indicated by establishment in field trials and seedling emergence from deep seedings, is comparable to 'Hycrest' and is consistently better than P-27. It produced significantly more forage dry matter than P-27 in most evaluation trials. Limited data indicate that Vavilov had slightly lower in vitro dry matter digestibility than P-27, however, levels of Mg, Ca, and K in the forage indicate that it was less likely to cause grass tetany in grazing animals than P-27. The cultivar produced 450 kg of seed ha$^{-1}$ when grown in rows 1 m apart on a dryland site that received 250 mm of annual precipitation. Supplemental irrigation increased seed yields $\sim$50%. At 100% purity, there are $\sim$330 000 seeds kg$^{-1}$.

Vavilov is a tetraploid (2n=4x=28) and is fully interfertile with cultivars of standard crested wheatgrass [Agropyron desertorum (Fisch. ex Link) Schultes], as well as the cultivar Hycrest. Cytological studies show that Siberian crested wheatgrass shares the P genome with diploid (2n=2x=14), tetraploid, and hexaploid (2n=6x=42) forms of the crested wheatgrass complex. Siberian wheatgrass is a perennial bunchgrass characterized by long, narrow linear spikes. Genetic introgression occurs between Siberian and standard forms in nature, and a gradation between the long, narrow spike of Siberian and the shorter, wider spike of standard forms is evident in Vavilov.

In its native habitat, the Siberian form of crested wheatgrass is more drought-resistant than either standard or fairway crested wheatgrass [Agropyron cristatum (L.) Gaertner sensu lato] and is better adapted to sandy soils than other crested wheatgrass types. Vavilov is recommended for semiarid range sites receiving 200 to 450 mm of precipitation annually at altitudes up to 2100 m. Under dryland range conditions, seeding at 8 kg ha$^{-1}$ is recommended.

Breeder, Foundation, and Certified seed classes will be recognized. Breeder seed will be maintained by the USDA-ARS Forage and Range Research Laboratory at Logan, UT. Foundation seed will be produced by the USDA-ARS at Logan and distributed to seed growers by the Utah Crop Improvement Association (Plants, Soils, and Biometeorology Department, Utah State University, Logan, UT 84322-4820). Production has been applied for under the U.S. Plant Variety Protection Act of 1970 as amended in 1994. Conditions of this license specify that seed of Vavilov can be marketed only as a class of certified seed.


References and Notes


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Registration of 'Douglas' Crested Wheatgrass

'Douglas' is the first cultivar of hexaploid (2n=6x=42) crested wheatgrass [Agropyron cristatum (L.) Gaertner sensu lato] (Reg. no. CV-22, PI 583979) to be released in North America. It was developed by a research team at the USDA-ARS Forage and Range Research Lab., Utah State University, Logan, UT, and released 1 July 1994 in cooperation with the Utah Agric. Exp. Stn. and the USDA Natural Resources Conservation Service (formerly the SCS). Douglas was evaluated as 6X-BLR. It was named in honor of Douglas R. Dewey, who established the germplasm base for the USDA-ARS grass breeding program at Logan.

The breeding population for Douglas was derived from hybrids between an accession from the former Soviet Union (PI 406442) and four other hexaploid accesses, three from Iran (PI 401076, PI 401080, and PI 401085) and one from Turkey (PI 173622). Accession PI 406442 is characterized by exceptionally broad leaves; it was used as the female parent in all crosses to retain the cytoplasm of this accession in the breeding population.

Two cycles of selection for broad leaf type, vegetative vigor, seed yield potential, and response to pests and drought were carried out in spaced-plant nurseries. The C2 population was screened for seed size and emergence from a 7.6-cm seeding depth. Breeder seed was produced from a composite of 10 selected open-pollinated progenies.

Douglas has larger seed than diploid and tetraploid cultivars, and it exhibited excellent establishment vigor in field evaluation trials. Based on emergence from 7.6-cm planting depth, seedling vigor of Douglas was significantly greater than 'Nordan', 'Fairway', and 'Ephraim' and equivalent to 'Hycrest'. Although it produces less total forage yield, it is leafier and its leaves remain green for a longer period during the growing season than other crested wheatgrass cultivars. Grazing animals preferred Douglas over other crested wheatgrass cultivars under sward conditions. Results from a semiarid range site in western Utah indicate that the in vitro digestibility of Douglas forage was significantly higher than that of other crested wheatgrass cultivars, particularly late in the growing season.

Douglas is not as resistant to drought as Hycrest and Nordan, and it is recommended for range sites receiving at least 250 mm of annual precipitation at altitudes below 2100 m. Under dryland range conditions, a seeding rate of 8 kg ha$^{-1}$ is recommended. Douglas produces $\sim$400 kg seed ha$^{-1}$ in seed-increase blocks established on dryland sites receiving 350 mm of annual precipitation. With a single irrigation, seed yields of more than 750 kg ha$^{-1}$ have been obtained. This hexaploid cultivar will hybridize with other diploid and tetraploid forms of crested wheatgrass, although the fertility of the hybrid progenies is substantially reduced. Accordingly, isolation from all other crested wheatgrass plants, regardless of ploidy level, is required in seed production fields.

Breeder, Foundation, and Certified seed classes will be recognized. Breeder seed will be maintained by the USDA-ARS Forage and Range Research Laboratory at Logan, UT. Foundation seed will be produced by the USDA-ARS at Logan and distributed to seed growers by the Utah Crop Improvement Association (Plants, Soils, and Biometeorology Department, Utah State University, Logan, UT 84322-4820).